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10 CFR § 50.73  
L-2010-233

U. S. Nuclear Regulatory Commission  
Attn: Document Control Desk  
Washington, D. C. 20555-0001

Re: Turkey Point Unit 4  
Docket No. 50-251  
Reportable Event: 2010-004-00  
Date of Event: September 8, 2010  
Reactor trip during Replacement of Degraded Relay in the Reactor Protection System

The attached Licensee Event Report 05000251/2010-004-00 is being submitted pursuant to 10 CFR 50.73(a)(2)(iv)(A) due to a valid actuation of the Reactor Protection System.

If there are any questions, please call Mr. Robert Tomonto at 305-246-7327.

Very truly yours,

Michael Kiley  
Vice President  
Turkey Point Nuclear Plant

Attachment

cc: Regional Administrator, USNRC, Region II  
Senior Resident Inspector, USNRC, Turkey Point Nuclear Plant

IE22  
NPR

NRC FORM 366 (10-2010)		U.S. NUCLEAR REGULATORY COMMISSION			APPROVED BY OMB: NO. 3150-0104		EXPIRES: 10/31/2013			
<b>LICENSEE EVENT REPORT (LER)</b>					Estimated burden per response to comply with this mandatory collection request: 80 hours. Reported lessons learned are incorporated into the licensing process and fed back to industry. Send comments regarding burden estimate to the FOIA/Privacy Section (T-5 F53), U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, or by internet e-mail to <a href="mailto:infocollects.resource@nrc.gov">infocollects.resource@nrc.gov</a> , and to the Desk Officer, Office of Information and Regulatory Affairs, NEOB-10202, (3150-0104), Office of Management and Budget, Washington, DC 20503. If a means used to impose an information collection does not display a currently valid OMB control number, the NRC may not conduct or sponsor, and a person is not required to respond to, the information collection.					
1. FACILITY NAME Turkey Point Unit 4					2. DOCKET NUMBER 050000251		3. PAGE 1 OF 5			
4. TITLE Reactor trip during Replacement of Degraded Relay in the Reactor Protection System										
5. EVENT DATE			6. LER NUMBER			7. REPORT DATE			8. OTHER FACILITIES INVOLVED	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REV NO.	MONTH	DAY	YEAR	FACILITY NAME	DOCKET NUMBER
09	08	2010	2010	- 004	- 00	11	05	2010	FACILITY NAME	DOCKET NUMBER
9. OPERATING MODE  1			11. THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR§: (Check all that apply)							
			<input type="checkbox"/> 20.2201(b)		<input type="checkbox"/> 20.2203(a)(3)(i)		<input type="checkbox"/> 50.73(a)(2)(i)(C)		<input type="checkbox"/> 50.73(a)(2)(vii)	
10. POWER LEVEL  100%		<input type="checkbox"/> 20.2201(d)		<input type="checkbox"/> 20.2203(a)(3)(ii)		<input type="checkbox"/> 50.73(a)(2)(ii)(A)		<input type="checkbox"/> 50.73(a)(2)(viii)(A)		
		<input type="checkbox"/> 20.2203(a)(1)		<input type="checkbox"/> 20.2203(a)(4)		<input type="checkbox"/> 50.73(a)(2)(ii)(B)		<input type="checkbox"/> 50.73(a)(2)(viii)(B)		
		<input type="checkbox"/> 20.2203(a)(2)(i)		<input type="checkbox"/> 50.36(c)(1)(i)(A)		<input type="checkbox"/> 50.73(a)(2)(iii)		<input type="checkbox"/> 50.73(a)(2)(ix)(A)		
		<input type="checkbox"/> 20.2203(a)(2)(ii)		<input type="checkbox"/> 50.36(c)(1)(ii)(A)		<input checked="" type="checkbox"/> 50.73(a)(2)(iv)(A)		<input type="checkbox"/> 50.73(a)(2)(x)		
		<input type="checkbox"/> 20.2203(a)(2)(iii)		<input type="checkbox"/> 50.36(c)(2)		<input type="checkbox"/> 50.73(a)(2)(v)(A)		<input type="checkbox"/> 73.71(a)(4)		
		<input type="checkbox"/> 20.2203(a)(2)(iv)		<input type="checkbox"/> 50.46(a)(3)(ii)		<input type="checkbox"/> 50.73(a)(2)(v)(B)		<input type="checkbox"/> 73.71(a)(5)		
		<input type="checkbox"/> 20.2203(a)(2)(v)		<input type="checkbox"/> 50.73(a)(2)(i)(A)		<input type="checkbox"/> 50.73(a)(2)(v)(C)		<input type="checkbox"/> OTHER		
		<input type="checkbox"/> 20.2203(a)(2)(vi)		<input type="checkbox"/> 50.73(a)(2)(i)(B)		<input type="checkbox"/> 50.73(a)(2)(v)(D)		Specify in Abstract below or in NRC Form 366A		
12. LICENSEE CONTACT FOR THIS LER										
NAME Olga Hanek								TELEPHONE NUMBER (Include Area Code) 305-246-6607		
13. COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT										
CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO EPIX	
X	JC	RLY	W120	NO						
14. SUPPLEMENTAL REPORT EXPECTED						15. EXPECTED SUBMISSION DATE		MONTH	DAY	YEAR
<input type="checkbox"/> YES (If yes, complete 15. EXPECTED SUBMISSION DATE) <input checked="" type="checkbox"/> NO										
ABSTRACT (Limit to 1400 spaces, i.e., approximately 15 single-spaced typewritten lines)										
<p>On September 8, 2010, with Unit 4 operating at 100% power, an unplanned automatic reactor trip occurred at approximately 13:45 during replacement of the 4B Reactor Protection System (RPS) Left Turbine Stop Valve Closure Logic Relay 4-SL-X-B [JC:RLY]. All rods fully inserted and all systems responded as designed and the unit was stabilized in Mode 3. At 15:52, an 4-hour report (EN# 46235) was made to the NRC Operations Center in accordance with 10 CFR 50.72(b)(2)(iv)(B) and 10 CFR 50.72(b)(3)(iv)(A) due to an automatic reactor trip and actuation of the Auxiliary Feedwater System. The reactor trip was caused by the opening of the 4B RPS trip breaker due to the de-energizing of reactor trip relays RT-9 and RT-10 when the two leads were lifted off terminal 1 of relay 4-SL-X-B during the replacement evolution.</p> <p>Deficiencies in the work order package and guiding procedure failed to establish and/or verify the plant conditions required to successfully complete the evolution. Corrective actions included replacement of the degraded relay 4-SL-X-B and revisions to the work order package and guiding procedures to ensure the Reactor Trip Bypass Breaker shall be in the closed position when replacing any reactor protection relay while the unit is in operational Modes 1 or 2.</p>										

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## NARRATIVE

## DESCRIPTION OF THE EVENT

On September 8, 2010, with Unit 4 operating at 100% power, an unplanned automatic reactor trip occurred at approximately 13:45 during replacement of the 4B Reactor Protection System (RPS) Left Turbine Stop Valve Closure Logic Relay 4-SL-X-B [JC:RLY]. All systems responded as designed and the unit was stabilized in Mode 3 on normal off-site power. Auxiliary Feedwater automatically initiated when Steam Generator levels lowered below the actuation setpoint. When Steam Generator levels were stabilized within the normal operating band, Auxiliary Feedwater was secured. Normal Feedwater was re-established to the Steam Generators and decay heat was removed via the turbine bypass valves to the condenser. Relay 4-SL-X-B was replaced and the unit was returned to service upon validation that the cause of the trip was not equipment-related.

At 15:52, an 4-hour report (EN# 46235) was made to the NRC Operations Center in accordance with 10 CFR 50.72(b)(2)(iv)(B) due to actuation of the Reactor Protection System with the reactor critical and 10 CFR 50.72(b)(3)(iv)(A) due to a valid actuation of the Auxiliary Feedwater System, an Emergency Safeguards System. This event was entered into the Corrective Action Program as AR 578473.

## ANALYSIS OF THE EVENT

On September 8, 2010 at 0857, Operations commenced the performance of 4-OSP-049.1 "Reactor Protection System Logic Test." At this time, Operations closed the reactor trip bypass breaker 4B and entered a planned 2 hours action statement per Technical Specification (TS) 3/4.3.1 to perform the surveillance. TS 3/4.3.1, Reactor Trip System Instrumentation, Table 3.3-1, Functional Unit 19, Reactor Trip Breakers, Action 8 allows bypassing one channel for up to 2 hours for surveillance testing, provided the other channel is operable, otherwise, the unit must be in Hot Standby within 6 hours.

At 0948, during performance of the 4-OSP-049.1, the 4B RPS Left Turbine Stop Valve Closure Logic Relay 4-SL-X-B responded as expected during testing but did not respond as expected during the reset portion of the evolution when it did not return to its energized position immediately. As a result, the station entered an unplanned 6 hour action statement per Technical Specification 3.3.1, Table 3.3-1, Functional Unit 15.b, Turbine Stop Valve Closure, Action 12. Action 12 allows continued power operation until performance of the next required actuation logic test provided the inoperable channel is placed in the tripped condition within 6 hours. Operations continued performing the surveillance testing of the RPS per 4-OSP-049.1 in parallel of the troubleshooting activities for relay 4-SL-X-B.

At 10:57, with the 4B reactor trip bypass breaker still in the closed position, Operations exited the surveillance testing exception of Table 3.3-1, Functional Unit 19, Reactor Trip Breakers, Action 8 and entered the 6 hour shutdown action portion of Action 8. At 10:58 the 4B reactor trip bypass breaker was opened in accordance with 4-OSP-049.1 and Action 8 was exited.

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Troubleshooting activities revealed that relay 4-SL-X-B was exhibiting possible armature binding, an age-related degradation, and it required replacement. Therefore, at 11:05 Operations commenced the performance of 4-ONOP-049.1, Deviation or Failure of Safety Related or Reactor Protection Channels, due to the failure of relay 4-SL-X-B.

At 12:25, relay 4-SL-X-B was placed in the tripped condition in accordance with the requirements of Table 3.3-1, Functional Unit 15.b, Action 12. As a result, the station exited the 6 hour portion of the action statement per Technical Specification 3.3.1, Table 3.3-1, Functional Unit 15.b, Turbine Stop Valve Closure, Action 12. Action 12 allows continued power operation until performance of the next required actuation logic test provided the inoperable channel is placed in the tripped condition within 6 hours.

Replacement of the degraded relay 4-SL-X-B was started in accordance to work order 39011940-01. Using 0-GMI-049.1 "Testing and Replacement of BFD/NBFD Relays in Reactor Protection and Safeguards Systems," Maintenance lifted the leads on Terminal 1 of Relay 4-SL-X-B. At 13:45, the Unit 4 Reactor tripped as a result of lifting the leads. The reactor trip was caused by the opening of the 4B RPS trip breaker due to the de-energizing of reactor trip relays RT-9 and RT-10 when the two leads were lifted off terminal 1 of relay 4-SL-X-B during the replacement evolution and with the 4B reactor trip bypass breaker open.

0-GMI-049.1 requires replacement of the relay per work order 39011940. Work order 39011940-01 used in the replacement of relay 4-SL-X-B is a generic contingency work order planned to replace any RPS relay. The work order did not have a step requiring verification of plant conditions prior to performing the work. This is contrary to the requirements and guidance in 0-ADM-701.1, "Desktop Instructions for PWO Planning and Assembly of Work Packages," which requires that work orders establish the plant conditions required to do the work. In addition, 0-GMI-049.1 did not have a step requiring verification that the Reactor Trip Bypass Breaker was in the closed position prior to commencing replacement of the RPS relay 4-SL-X-B. Although the procedure and work order did not require verification of plant conditions prior to performing the work, personnel involved with the task had the knowledge that the reactor trip bypass breaker was required to be in the closed position to prevent a reactor trip during the replacement of 4-SL-X-B relay. Restoration of the reactor trip bypass breaker to the racked out and open position was completed by Operations at 10:58, as required by 4-OSP-049.1. Maintenance and Engineering personnel did not specifically verify the position of the Reactor Trip Bypass Breaker before starting the relay replacement. In addition, Operations personnel authorized the RPS relay replacement without identifying the required plant conditions had been established to perform the work. Maintenance and Engineering made the assumption that if Operations authorized the work, then the Reactor Trip Bypass Breaker was in the required closed position.

## CAUSE OF THE EVENT

The event was evaluated to determine the root cause and contributing causal factors. There were two root causes identified for the event:

1. Deficiencies in the work order package and guiding procedure failed to establish and/or verify the plant conditions required to successfully complete the evolution and relied on Operations staffing to provide the validation that the evolution could be performed.

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- The station failed to meet the standard of excellence expected for communication, accountability, ownership, formality, and rigor resulting in no one group having the full picture required to successfully complete the evolution.

## REPORTABILITY

The event is reportable in accordance with 10 CFR 50.73(a)(2)(iv)(A) due to automatic actuation of the Reactor Protection System when an unplanned reactor trip occurred during replacement of degraded RPS turbine stop valve relay 4-SL-X-B. It is also reportable in accordance with 10 CFR 50.73(a)(2)(iv)(B) due to automatic actuation of the Auxiliary Feedwater system.

## ANALYSIS OF SAFETY SIGNIFICANCE

The plant responded as expected to the automatic reactor trip. The Auxiliary Feedwater system actuated on low steam generator level as designed and the plant was stabilized in Mode 3. All systems functioned as required; therefore, there was no impact on safety. Upon validation that the cause of the trip was not equipment-related, the unit was restarted per the appropriate procedures.

## CORRECTIVE ACTIONS

## Short Term

- The degraded 4-SL-X-B relay was replaced prior to unit restart.
- The following compensatory actions were implemented:
  - The generic work order requires that the Reactor Trip Bypass Breaker be in the closed position when replacing any reactor protection relay while the unit is in operational Modes 1 or 2.
  - The generic work order requires that the position of the Reactor Trip Bypass Breaker be independently verified.
  - The site leadership team was briefed on the event and failure to meet expectations.

## Long Term Corrective Actions

- The work order preparation checklist in 0-ADM-701.1 will be updated with a requirement that the work order meet one of the following three requirements:
  - The procedure specifies the required plant conditions, or
  - The work order establishes the required plant conditions, or
  - A step is added to the work order that requires the plant initial conditions be explicitly written in the work order and verified in the plant with signature and independent verification
- A review of RPS work orders for both units was made and a list of work orders that involve or may involve relay replacements was identified. These work orders will be reviewed and changed accordingly to prevent an unexpected reactor trip.

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- Guidance on decision making expectations for short-duration Technical Specifications Action Statements and Limiting Condition of Operation statements will be developed to address expectations for communication and station response to emergent high risk activities.
- Additional corrective actions have been identified to address the root cause related to the organizational aspects of communication, accountability and ownership which contributed to the event. These are documented in AR 578473.

Implementation of the above corrective actions is being tracked by AR 578473.

Corrective actions to address the event's contributing factors have been entered in the Turkey Point Corrective Action Program in AR 578473.

**ADDITIONAL INFORMATION**

EIIS Codes are shown in the format [IEEE system identifier, component function identifier, second component function identifier (if appropriate)].

Condition Report AR 578473 was initiated due to this event.

**FAILED COMPONENTS IDENTIFIED:** RPS Left Turbine Stop Valve Closure Logic Relay 4-SL-X-B.

**PREVIOUS SIMILAR EVENTS:** None